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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/597,081	06/20/2000	Denis Toullier	Q59763	6081

7590 01/14/2004

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EXAMINER
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SEDIGHIAN, REZA

ART UNIT	PAPER NUMBER
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2633

DATE MAILED: 01/14/2004

9

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

09/597,081

Applicant(s)

TOULLIER ET AL.

Examiner

M. R. Sedighian

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 22 October 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-3 and 5-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

### Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3. 6) ☐ Other:

1. This communication is responsive to applicant's 10/22/2003 amendment's in the application of Denis Toullier et al. for "Multiband Raman Amplifier" filed 6/20/2000. The amendments have been entered. Claims 1-3 and 5-15 are now pending.

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 1-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

As to claim 1, it is not clear what is meant by "... a third input connected to a second input of the first circulator, receiving the first pumping signal from the first circulator and supplying the transmission signal to the first circulator". Figure 1 shows an optical circulator 15 with an input that is connected to a pump source 14 via Bragg grating 16, 17, and another input that is connected to a transmitter TX. Which input is the third input that is connected to the second input of the first circulator for receiving the first pumping signal from the first circulator, and for supplying the transmission signal to the first circulator??

As to claim 2, it is not clear what is meant by "... a third input connected to the second input of the second circulator, receiving the first and second pumping signals from the second circulator and supplying the transmission signal to the second circulator". Figure 1 shows a third circulator (circulator 8) that is connected to a second circulator (circulator 11), and wherein the second port of the third circulator is connected to the third port of the second circulator. It is not clear about a third input that is connected to the second input of the second circulator for

receiving the first and second pumping signals from the second circulator and supplying the transmission signal to the second circulator.

As to claim 3, it is not clear what is meant by "... a third input connected to the second input of the circulator of rank n-1, receiving the pumping signals of rank 1 to n-1 and supplying the transmission signal to the circulator of rank n-1". Which input is the third input that is connected to the second input of the circulator of rank n-1??

As to claim 6, it is not clear what is meant by "... the amplifier fiber connected to the second input of said second circulator, wherein the transmission signal is supplied to an other end of the amplifier fiber". Figure 1 shows an amplifier fiber 2 that is connected at one end to a first circulator 15, and at the other end to a transmitter TX. Apparently, amplifier fiber 2 is connected to the first circulator 15, not to the second circulator 11.

As to claim 11, it is not clear what is meant by "... the amplifier fiber connected to the second input of said third circulator, ..." Figure 1 shows an amplifier fiber 2 that is connected at one end to a first circulator (circulator 15), and at the other end to a transmitter TX. Amplifier fiber 2 is not connected to the third circulator (the circulator 8).

As to claim 12, it is not clear what is meant by "... the amplifier fiber connected to the second input of the circulator of rank M, ..." Figure 1 shows amplifier fiber 2 is connected to a first circulator (circulator 15) and to a transmitter TX. Amplifier fiber 2 is not connected to circulator of rank M.

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1, 5-7, 10, and 13-14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sian et al. (US Patent No: 6,449,072).

Regarding claim 1, as it is understood in view of above 112 problem, Sian teaches a system for injecting (54, 55, fig. 2) into an amplifier fiber (41, 42, fig. 2), pumping signals from multiple pumping sources at different wavelengths (51, 52, fig. 2), the system comprising: an output (for example output T2out that is connected to circulator 25) via which a transmission signal that is amplified by the amplifier fiber exits the system (amplified optical signal can exit from port T2out that is connected to circulator 25), a first pumping signal source (51 or laser 1, fig. 2) supplying a first pumping signal (a first pump signal from laser 1 is supplied to amplifier fiber 41), a first circulator (24, fig. 2) with a first input (the input of circulator 24 that is connected to grating 31) connected to the first pumping signal source (the pump signal from laser 1 enters port 1 of circulator 24), a second input (the input port of circulator 24 that is connected to the input line T1in) supplying the first pumping signal from the first pumping signal source and receiving the transmission signal (note that part of the amplified signal can reach this port, also this port gets an input signal T1in), and a third input (the input that connects circulator 24 to circulator 25) supplying the transmission signal to the output (the transmission signal T1in can be transmitted from this port to circulator 25), a second pumping signal source (52 or laser 2 in fig. 2) supplying a second pumping signal (a second pump signal from laser 2 is coupled to fiber 42), and a second circulator (25, fig. 2) with a first input (the input of circulator 25 that is connected to grating 32) connected to the second signal source via reflector means (32,

fig. 2), a second input (the input of circulator 25 that is connected to T2out) supplying the first and second pumping signals from the first and second pumping signal sources and receiving the transmission signal (note that optical signals of the first and second pumps and the transmission signal T1in can reach this port), and a third input (the input T1in in fig. 2) connected to a second input of the first circulator (24, fig. 2) for receiving the first pumping signal from the first circulator and supplying the transmission signal to the first circulator (note that optical signal of the first pump can reach the port of the circulator 24 that is connected to T1in and the signal T1in can reach the input port of circulator 24). Sian differs from the claimed invention in that Sian does not specifically disclose the reflecting means reflects the first pumping signal from the first pumping signal source. Sian discloses fiber Bragg gratings 31 and 32 for reflecting wavelength of  $\lambda_1$  and  $\lambda_2$ . It would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate a specific Bragg grating, for grating 32 to reflect the transmitted signal that are entered and reached the second circulator 25, to further drop the transmitted signal at a specific port.

Regarding claim 5, Sian teaches the reflector means (32, fig. 2) is a Bragg grating (col. 5, lines 19-20).

Regarding claims 6 and 10, as it is understood in view of above 112 problem, Sian teaches the system injecting the first and second pumping signals (51, 52, fig. 2) into an end of the amplifier fiber (41, 42, fig. 2), and wherein the transmission signal is supplied to another end of the amplifier fiber (for example fiber 41 is connected to port that gets the transmitted signal).

Regarding claim 7, Sian teaches the amplifier fiber (41, fig. 2) is a line fiber (note that amplifier fiber 41 is positioned along the fiber line that connects the two circulator 21 and 24).

Regarding claims 13-14, as to a receiver for receiving the transmission signal from the output, and no signal from the receiver reaches the third input of the first circulator, it is well known to have an optical receiver at one end of a fiber line to receive and retrieve the transmitted signal.

6. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sian et al. (US Patent No: 6,449,072) in view of Pan (US patent No: 5,81,712).

Regarding claim 8, Sian differs from the claimed invention in that Sian does not disclose the amplifier fiber is not a line fiber. Pan teaches an optical semiconductor amplifier (30, fig. 6) that is connected to an optical circulator (32, fig. 6). One of the ordinary skill in the art would have been motivated to incorporate optical amplifiers along the optical transmission lines in order to boost the light signals and to increase the total transmission distance. Therefore, it would have been obvious to an artisan at the time of invention to incorporate a semiconductor optical amplifier such as the one Pan for the amplifier fiber in the optical transmission system of Sian in order to boost the signals to desired level and to improve the overall transmission performance.

7. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sian et al. (US Patent No: 6,449,072) in view of Kerfoot, III et al. (US patent No: 6,320,884).

Regarding claim 9, Sian differs from the claimed invention in that Sian does not teach the amplification is effected by a Stimulated Raman Scattering. Kerfoot teaches a method of Raman amplification based on Stimulated Raman Scattering (col. 1, lines 24-42, col. 2, lines 63-67, col. 3, lines 1-24). Stimulated Raman Scattering amplification is advantageous because it

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can provide better signal amplification and it permits longer fiber span while introducing less noise. Therefore, it would have been obvious to an artisan at the time of invention to incorporate a method of Raman amplification such as the one of Kerfoot for the amplification stage in the optical transmission system of Sian in order to provide a broad bandwidth optical amplifier with a wide amplification range to achieve transmission of high capacity optical signals.

8. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sian et al. (US Patent No: 6,449,072) in view of Grasso et al. (US patent No: 6,288,810).

Regarding claim 15, Sian differs from the claimed invention in that Sian does not disclose an optical isolator at the other end of the amplifier fiber where the transmission signal is supplied. Grasso teaches optical amplification stages (32, 36), wherein optical isolators (31, 35) are used to prevent back reflection of signal lights (col. 7, lines 19-24). It is well known to put an optical isolator along an optical fiber line to block back reflection of the optical signals. Therefore, it would have been obvious to a person of ordinary skill in the art at the time of invention to incorporate an isolator such as the ones of Grasso along the fiber line in the optical transmission and amplification system of Sian in order to block the back reflection of pumping signals.

9. Applicant's arguments with respect to claims 1-3 and 5-10 have been considered but are moot in view of the new ground(s) of rejection.



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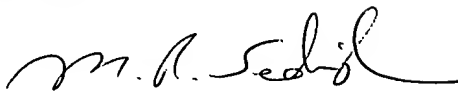
10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. R. Sedighian whose telephone number is (703) 308-9063. The examiner can normally be reached on M-F (from 9 AM to 5 PM).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jason Chan can be reached on (703) 305-4729. The fax phone numbers for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

  
M.R. SEDIGHIAN  
Patent Examiner  
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